

**Key data**

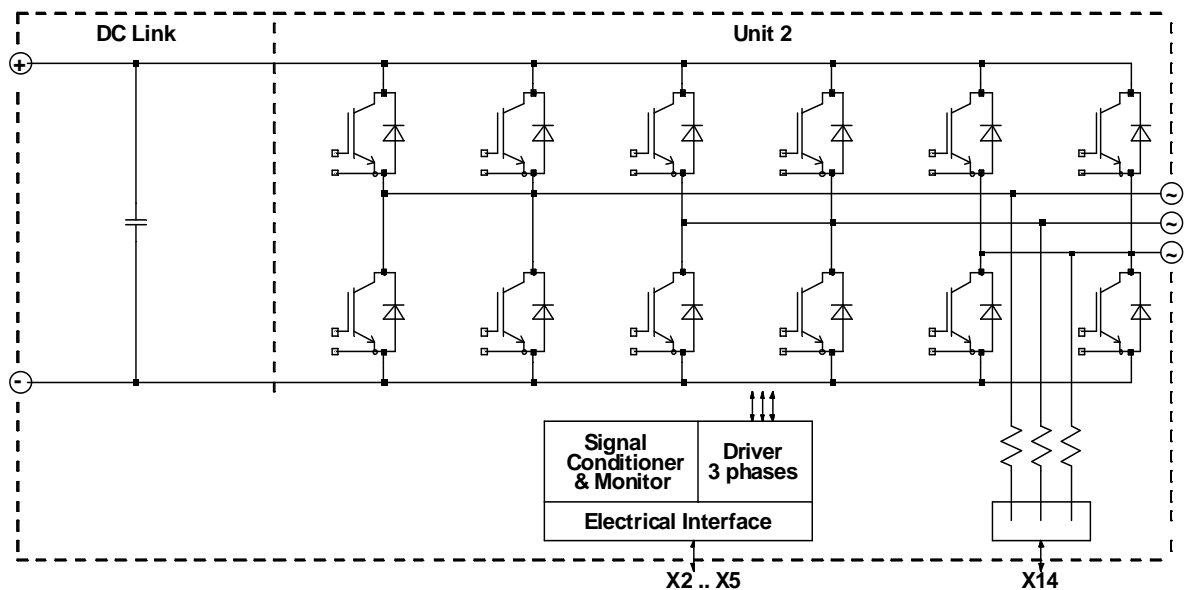
3x 726A rms at 707V rms, water cooled

**General information**

Stacks for various inverter application. Semiconductors, heat sinks, capacitors, drivers and sensors included. These are only technical data!

Please read carefully the complete documentation and maintain the proper design environment! Especially note the EMC environment and the controller's functionality.

Topology		DC Link + B6I
Application / Modulation		Inverter / Sine
Load type		resistive, inductive
Cooling		water cooled
Market		wind
Implemented sensors		current, voltage, temperature
Semicond. (Unit 1)		none
DC Link		18.8mF
Semicond. (Unit 2)	IGBT	6x FF1200R17KE3_B2
Driver signals IGBT		electrical CMOS
Standards		EN50178
Internal ID		32274
Mechanical drawing number		31361_MB
Electrical drawing number		57000008
Dimensions (width x depth x height)		1090 mm x 596 mm x 274 mm
Weight		83 kg



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# Technical Information

ModSTACK™

## 6MS2400R17KE3-3WAH-VFRZ



**Vorläufige Daten**  
preliminary data

### Note

Heat sink with aluminium cooling channel.  
Composites of fluid: Water and 52 vol. % Antifrogen N.  
The STACK contains customize filter resistors.

### Electrical data

#### DC Link

			min	typ	max	units
Voltage		$V_{DC}$		1150	1250	V
Overvoltage shutdown	within 150µs			1250		V

#### Unit 2 AC

			min	typ	max	units
Voltage	depending on controller	$V_{Unit2}$		707		$V_{RMS}$
Continuous current	$V_{Unit2} = 707V_{RMS}$ , $V_{DC} = 1150V$ , $T_{inlet} = 40^{\circ}C$ , $T_J \leq 125^{\circ}C$ , $f_{Unit2} = 50Hz$ , $f_{sw2} = 3000Hz$ , $\cos(\phi) = 0,95$	$I_{Unit2}$			726	$A_{RMS}$
Continuous current overload cap.	$T_{inlet} = 40^{\circ}C$ , for overload capability 150% for 60s			553		$A_{RMS}$
Short time current	$T_{inlet} = 40^{\circ}C$ , 10s, every 180s, initial load = $701A_{RMS}$	$I_{Unit2}$			876	$A_{RMS}$
DC current	no rotating field, $T_{inlet} = 40^{\circ}C$	$I_{Unit2 DC}$			290,0	$A_{av}$
Overcurrent shutdown	within 15µs			3000		$A_{peak}$
Switching frequency		$f_{sw2}$			3000	Hz
Power losses	$V_{Unit2} = 707V$ , $V_{DC} = 1150V$ , $T_{inlet} = 40^{\circ}C$ , $T_J \leq 125^{\circ}C$ , $f_{Unit2} = 50Hz$ , $f_{sw2} = 3000Hz$ , $\cos(\phi) = 0,95$ , $I_{Unit2} = 726A_{RMS}$	$P_{loss2}$		12200		W
Power factor		$\cos(\phi)_{Unit2}$	-1,00		1,00	

#### General data

			min	typ	max	units
Power losses (PCB and capacitor)		$P_{loss aux}$			400	W
EMC test	according to IEC61800-3 at named interfaces	power	$V_{Burst}$	2		kV
		control	$V_{Burst}$	1		kV
		aux (24V)	$V_{Surge}$	1		kV
Insulation management is designed for		$V_{Line}$		690		$V_{RMS}$
Insulation test voltage	according to EN50178, $f = 50Hz$ , $t = 60s$	$V_{isol}$		2,5		$kV_{RMS}$

#### Important component data

			min	typ	max	units
DC Link capacitor		$C_{DC}$		18,80		mF
		type	Electrolytic Capacitor			
wiring system	series, parallel		3s, 10p			
Balance or discharge resistors	per DC Link unit	$R_b$		6,0		kΩ
Filter resistor				22		Ω

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### Vorläufige Daten preliminary data

#### Controller interface data

			min	typ	max	units
Auxiliary voltage		$V_{aux}$	18	24	30	$V_{av}$
Auxiliary power requirement	$V_{aux} = 24V_{av}$	$P_{aux}$	40			W
Driver and interface board	see separate technical information		TR110 / DR110			
Driver core			EiceDRIVER 2ED300C17-S			
Digital input level	resistor to GND 1,8k $\Omega$ , capacitor to GND 4nF, high = on, min 15mA	$V_{in}$	0,0		15,0	V
Digital output level	open collector, low = ok, max 15mA	$V_{out}$	0,0		15,0	V
Analog current outputs Unit 2	load max 1mA; at 726A	$V_{ana\ out}$	4,78	4,88	4,98	V
Analog DC Link voltage output	load max 1mA; at 1250V	$V_{DC\ out}$	8,79	8,97	9,15	V
Analog temperature output	load max 1mA; at $T_{NTC} = 69^{\circ}C$ correspond to $T_j = 125^{\circ}C$	$V_{T\ out}$	9,80	10,00	10,20	V
Overtemperature shutdown	at $T_{NTC} = 69^{\circ}C$ correspond to $T_j = 125^{\circ}C$	$V_{T\ out\ OT}$		10		V
Overvoltage shutdown reaction time	after overvoltage message by ModSTACK™ interface				50	$\mu s$
Overcurrent shutdown reaction time	after overcurrent message by ModSTACK™ interface				10	$\mu s$

#### Heat sink water cooled / Thermal data

			min	typ	max	units
Water flow	according cooling water specification from infineon	$\Delta V / \Delta t_{Water}$	12			dm <sup>3</sup> /min
Water pressure drop		$\Delta p_{Water}$		550		mbar
Water pressure					8	bar
Cooling water inlet temperature		$T_{inlet}$	-25		40	$^{\circ}C$
Water connection				3/4		in

#### IGBT data unit 2

			min	typ	max	units
Type	assumed					
collector-emitter saturation voltage	$I_c = 1200A$ ; $V_{ge} = 15V$ ; $T_{vj} = 125^{\circ}C$	$V_{CE\ sat}$		2,4		V
parameter for linear model	$T_{vj} = 25^{\circ}C$	$V_{ce1}$		1,1		V
parameter for linear model	$T_{vj} = 25^{\circ}C$	$r_{ce1}$		0,75		m $\Omega$
parameter for linear model	$T_{vj} = 125^{\circ}C$	$V_{ce2}$		1		V
parameter for linear model	$T_{vj} = 125^{\circ}C$	$r_{ce2}$		1,167		m $\Omega$
turn-on / turn-off energy loss per pulse	$T_{vj} = 25^{\circ}C$	$E_1$		240 / 305		mJ
turn-on / turn-off energy loss per pulse	$T_{vj} = 125^{\circ}C$	$E_2$		350 / 445		mJ
thermal resistance, junction to case	per IGBT	$R_{thjc}$		0,019		K/W
thermal resistance, case to heatsink	per IGBT	$R_{thch}$		0,023		K/W

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# Technical Information

ModSTACK™

## 6MS2400R17KE3-3WAH-VFRZ



### Vorläufige Daten preliminary data

#### Diode data unit 2

			min	typ	max	units
Type	assumed					
forward voltage	$I_F = 1200A; V_{ge} = 0V; T_{vj} = 125^\circ C$	$V_F$		1,9		V
parameter for linear model	$T_{vj} = 25^\circ C$	$V_{F1}$		1,15		V
parameter for linear model	$T_{vj} = 25^\circ C$	$r_{F1}$		0,542		mΩ
parameter for linear model	$T_{vj} = 125^\circ C$	$V_{F2}$		1		V
parameter for linear model	$T_{vj} = 125^\circ C$	$r_{F2}$		0,75		mΩ
reverse recovery energy	$T_{vj} = 25^\circ C$	$E_{rec1}$		190		mJ
reverse recovery energy	$T_{vj} = 125^\circ C$	$E_{rec2}$		340		mJ
thermal resistance, junction to case	per Diode	$R_{thjc}$		0,042		K/W
thermal resistance, case to heatsink	per Diode	$R_{thch}$		0,052		K/W

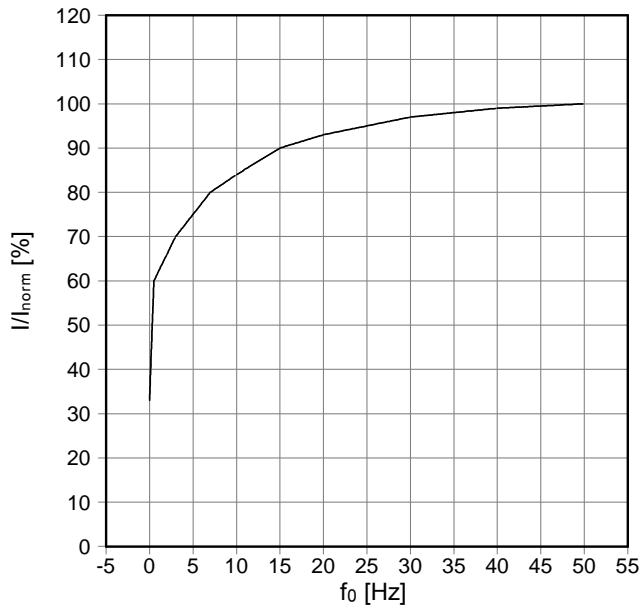
#### Environmental conditions

			min	typ	max	units
Storage temperature		$T_{stor}$	-40		65	°C
Ambient temperature		$T_{amb}$	-25		55	°C
Operating temperature	see chapter Heat sink water cooled / Thermal data					
Cooling air velocity (PCB and capacitor)		$V_{Air PCB}$	2,0			m/s
Air pressure	standard atmosphere	$p_{Air}$	900		1100	hPa
Humidity	no condensation	Rel. F	0		95	%
Installation height			0		1000	m
Vibration	according to EN60068				10	m/s <sup>2</sup>
Continuous vibration	according to EN60068				20	m/s <sup>2</sup>
Shock	according to EN60068				100	m/s <sup>2</sup>
Protection degree				IP00		
Pollution degree				2		
Dimensions	width × depth × height		1090	596	274	mm
Weight with heat sink	approximation			83,0		kg
Weight without heat sink	approximation			65,0		kg

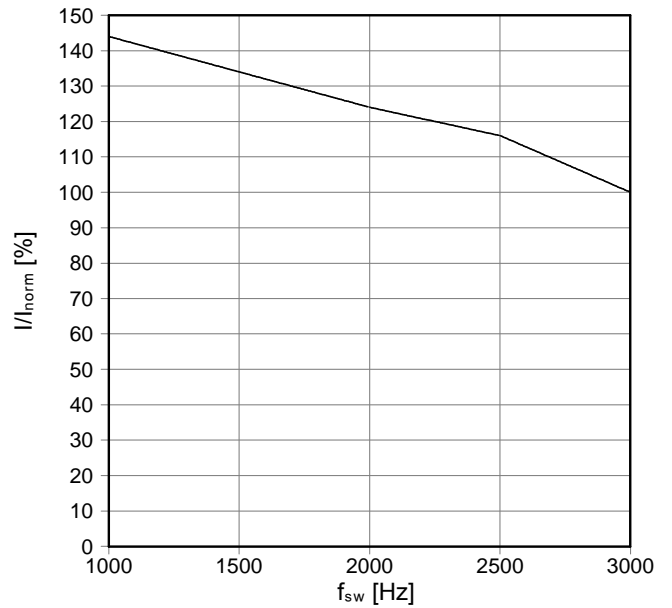
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Vorläufige Daten  
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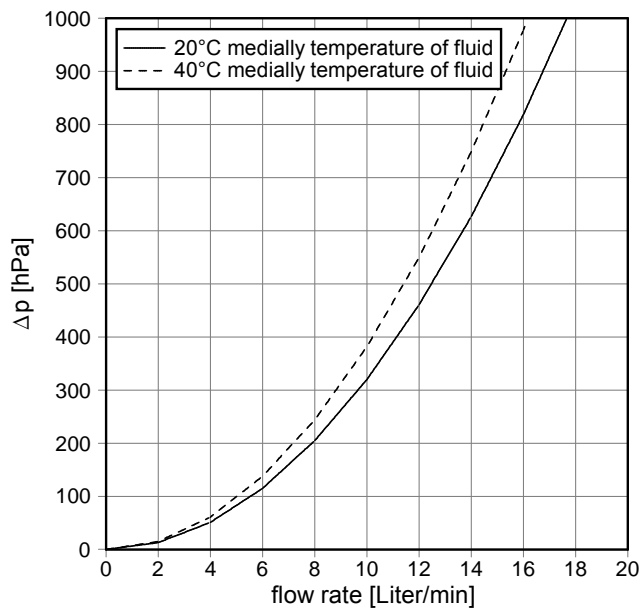
**f<sub>0</sub> - derating curve IGBT (motor)**  
 cos(phi) = 0,95  
 T<sub>cool medium</sub> = 40°C



**f<sub>sw</sub> - derating curve IGBT (motor)**  
 cos(phi) = 0,95  
 T<sub>cool medium</sub> = 40°C

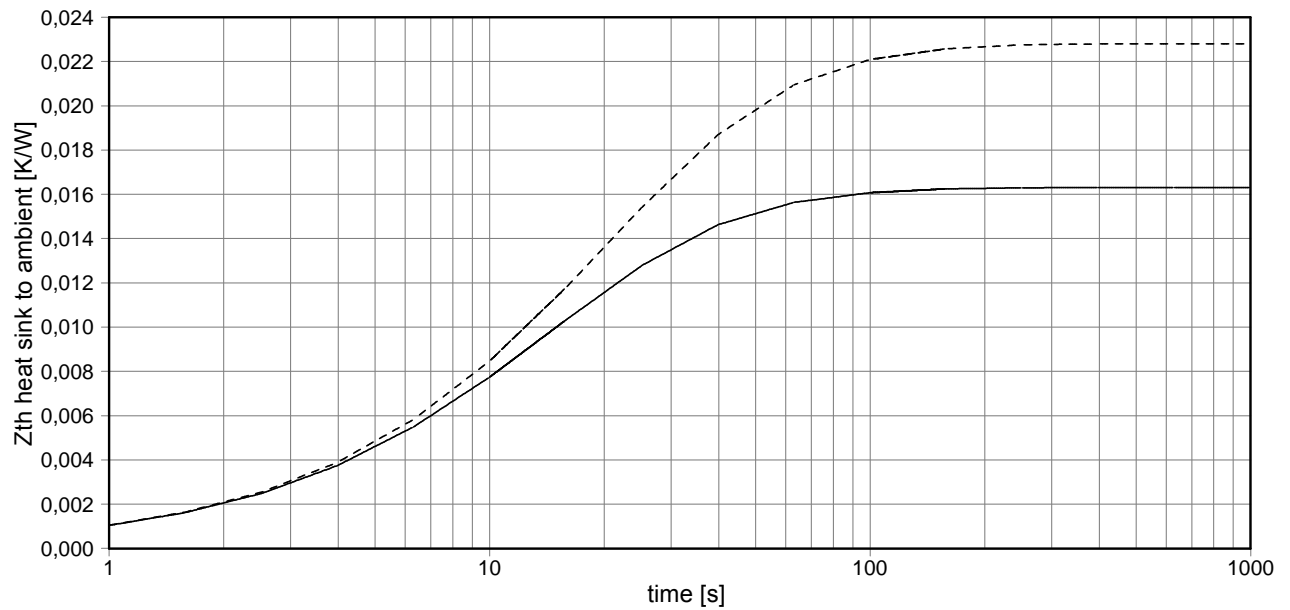


**Pressure drop as a function of flow rate**



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Transient thermal impedance per module  
T<sub>cool medium</sub> = 40°C



— Water

i:	1	2	3	4
r <sub>i</sub> [K/W]:	0,00001	0,01387	0,00231	0,00011
τ <sub>i</sub> [s]:	7,556	13,62	41,1	50,89

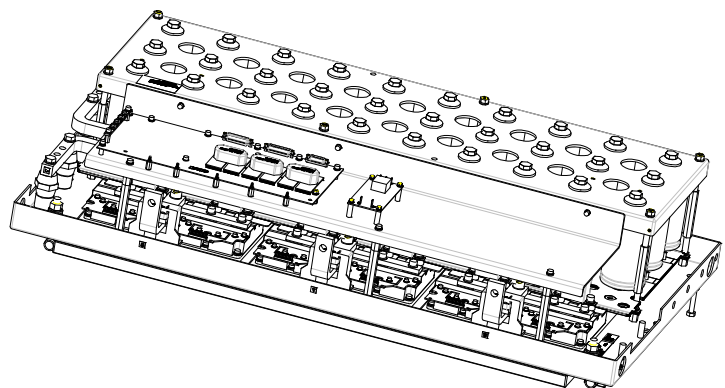
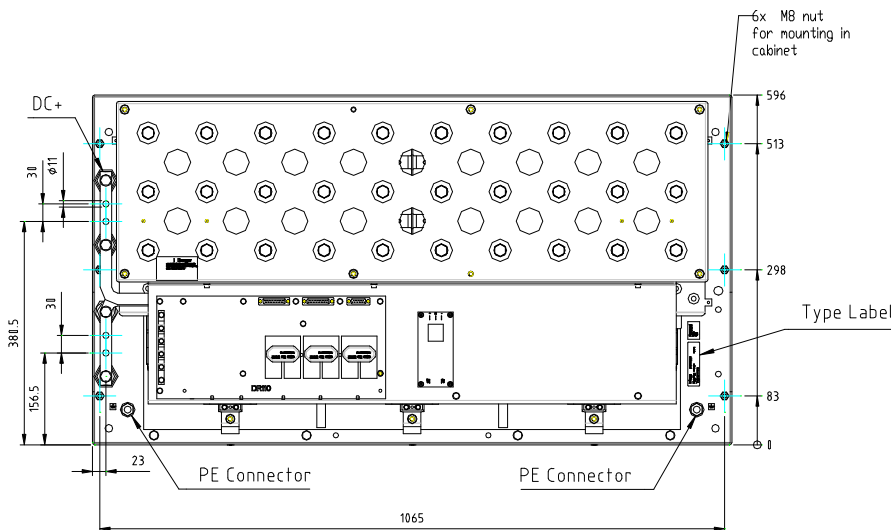
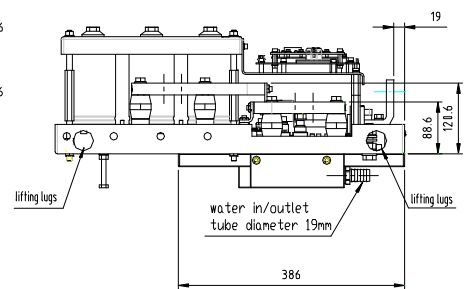
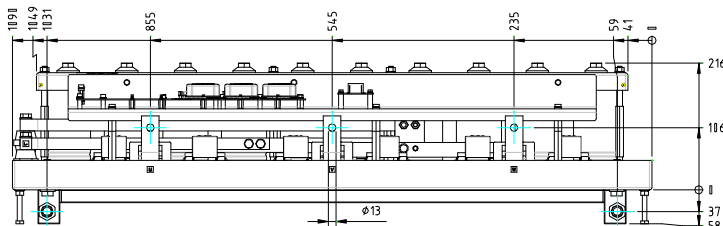
--- Water + Antifrogen N (52%)

i:	1	2	3	4
r <sub>i</sub> [K/W]:	0,00001	0,01941	0,00323	0,00015
τ <sub>i</sub> [s]:	10,58	19,06	57,55	71,24

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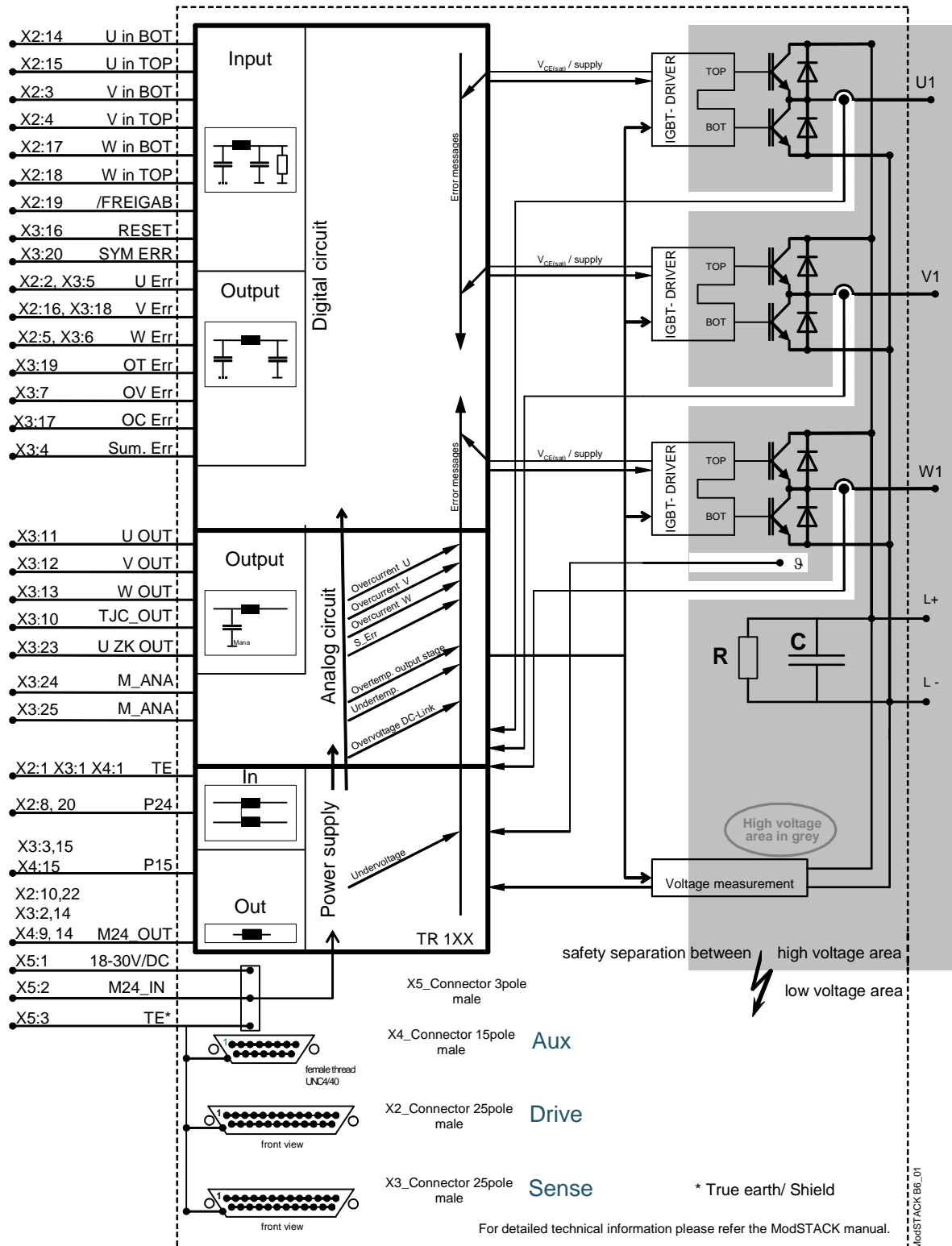
Mechanical drawing

6MS \_\_\_ R \_\_\_ -3W \_\_\_ -V \_\_\_  
ModSTACK Size 3  
31361\_MB



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Circuit diagram



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**Sicherheitshinweise**

Bevor Sie mit der Installation und dem Betrieb der Baugruppe beginnen, lesen Sie bitte sorgfältig alle Sicherheitshinweise, Warnungen und beachten Sie die angebrachten Warnschilder. Vergewissern Sie sich, dass alle Warnschilder in leserlichem Zustand verbleiben und fehlende oder beschädigte Schilder ersetzt werden.

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